



UNIVERSITY OF GOTHENBURG

Preventing stress through smartphone usage

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ABSTRACT

Originating from the concept *constant connectivity*, a number of state of the art aspects can be seen. Constant connectivity itself implies that a person, as a consequence of information technology devices, always is available, reachable and able to process information. However, certain side effects of this phenomenon have been identified. Research have concluded that constant connectivity leads to negative health effects such as stress, insomnia and symptoms of depression. As the number of devices contributing to this exposure increases, the identified problems are becoming gradually more relevant. As these devices are becoming important tools in one's working life, it is interesting to investigate whether the usage of these devices to any extent can prevent negative health effects as well. This thesis looks into that matter, guided by the question: *To what extent do IT consultants, employed by small to medium-sized companies, circumvent stress due to usage of smartphone techniques?* To answer the question at issue, six semi-structured interviews based on theories of stress, job environment, smartphone technologies and communication were conducted with IT consultants. The information gathered from the interviews, were analysed and transformed into patterns, answering the question. The main findings were that smartphone usage definitely can cause stress, but at the same time function as means to prevent stress. By active and passive approaches to prevent stress the IT consultants interviewed have adopted beneficial ways to handle their smartphones. Active approaches, as the definition implies, are usage patterns that to a greater extent are individualised by a specific consultant – such as different ways of multitasking with the smartphone. Passive approaches, on the other hand, are patterns that are more general and static for the whole study population. Passive approaches are, for example, about how to leverage availability and constant connectivity as a means to avoid stress.

Keywords: constant connectivity, stress, smartphone

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1. INTRODUCTION SECTION

“The Swiss army-knife of the 21st century” – a smartphone metaphor described by Livingston (2004) a couple of years ago. A Swiss army knife has plenty of useful tools in a nimble format – which is exactly what a smartphone offers its users, as well. Because, apart from the standard mobile phones functionalities – such as calling and sending text messages – a smartphone allows the users to utilise more advanced functionalities resembling the ones of a computer such as video calling, Internet browsing, e-mail handling, individualised applications and so on. Similar to a Swiss army knife the users are not bound to a particular geographic position when using these functionalities. Furthermore, the smartphone usage is constantly increasing, both seen to numbers of users and data traffic generated (Cisco, 2012) – indicating they are becoming a gradually more prominent aspect of peoples’ working and private lives.

However, the distinct usage growths we have at hand are evolving into a problematic state of the art situation. Problematic since the many positive usage aspects of smartphones come hand in hand with seriously negative prospective health effects. Actually, there is recent research showing that heavy smartphone and computer usage is causing stress, insomnia and depression (Thomée, 2012).

The future in this respect can thus take two turns – either the usage of smartphones decreases due to its negative health effects, or the usage as expected further increases and the smartphones become an even more intertwined part of society.

1.1 PROBLEM AREA

As the problematic situation just mentioned is becoming more apparent the interest of the subject is growing, as well. A prominent problem that we are facing, due to these technologies is the fact that we, as individuals, to a greater extent are subjects to *constant connectivity* – not least due to more frequent usage of smartphones. Constant connectivity is a term that incorporates many nuances – with the common denominator that all nuances have to do with always being available in one way or another. One important aspect of the constant connectivity term is that boundaries (that earlier were clear) between ones work and private life nowadays are becoming obscure, because of the possibility to always receive and process information. Furthermore, expectations from both oneself and others, to always be available can intensify the perceived need of actually being constantly connected. The situation challenges one’s ability to set boundaries, which is not as simple as it sounds. Actually, there is research showing that it can be just as stressful to actively choose to exclude oneself from constant connectivity (Västra Götalandsregionen, 2012). The situation can thus in this respect be perceived as somewhat hopeless – whether you choose to be available or not, you still suffer from the possible negative health effects.

Earlier comprehensive work within this general area has been made by Thomée (2012), who in her PhD thesis investigated the mental health effects in young adults due to use of computers and mobile phones. The background for her research was that little is known about the effects of this exposure. Her conclusions were that intensive use of computers and mobile phones – in her context termed information and communication technology, ICT – could lead to negative mental health outcomes. Figure 1 (Thomée, 2012, s. 49) depicts and summarises her findings on a high level.

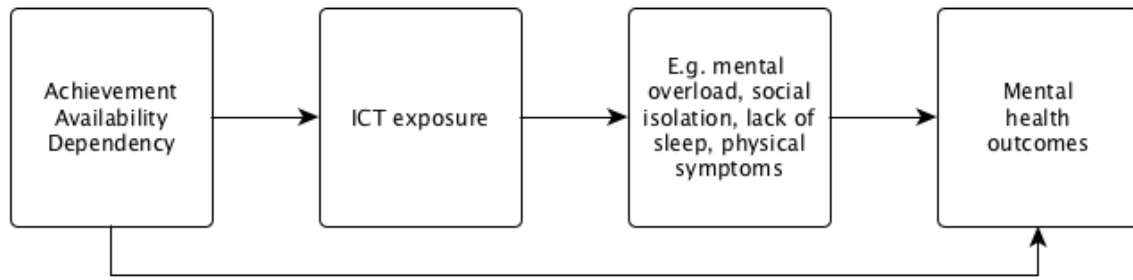


Figure 1 - Summary of Thomée's findings regarding ICT exposure and mental health outcomes.

As can be seen, the findings of her research were that intensive use of computers and mobile phones could have consequences corresponding with for instance mental overload, lack of sleep, lack of physical activity, social isolation, role conflicts, worries about radiation and addiction, just to mention a few. These consequences of ICT exposure, in turn, could lead to mental health outcomes. A mental health outcome in Thomée's context is more specifically stress, sleep disturbances or symptoms of depressions. Furthermore, she found that intensive ICT use could be triggered by demands for achievement and availability as well as personal dependency. These triggers for ICT use could also according to Thomée be direct sources of mental health problems, independently of ICT exposure. Demands for achievement can be exemplified as in one's work or study environment perform demanding tasks, trying to keep deadlines and working long hours. In terms of availability, these demands can originate from a work or study place, as well as from friends and family. Finally, personal dependency takes the form of a compulsion towards an ICT device – like for instance feeling an instant need for checking messages or playing a game (Thomée, 2012).

1.2 PURPOSE OF STUDY

Our study is closely related to Thomée's (2012) with some distinguishing differences specified below. As mentioned in the previous chapter, Thomée's (2012) work showed that ICT usage could cause stress reactions. The purpose of this study, originating out of Thomée's (2012) work, is to describe *if and how* our chosen study population are able to *avoid* the theory based stress effects caused by smartphone usage in their professional and private life. We are influenced by Thomée's earlier work, but have chosen to delimitate from her wider scope of mental illnesses and large study population – and as well, chosen to investigate the context from another angle, namely whether smartphone usage also can be a means to *prevent* stress.

Since elements of stress may be unusual and more pervasive for some professional groups and, potentially, a totally normal job characteristic for others, we had to find something in between these extremes, suitable for being part of our thesis. Moreover, to get our findings as empirical entrenched as possible we also found it very important to have a study population that actually use smartphones intensively. Having these aspects in mind when choosing study population, we found it very suitable to decide for *IT consultants*. Besides fulfilling the criteria of being intensive users of smartphones, IT consultants also are closely related to our educational orientation, which we consider a benefit.

The primary reason for focusing on the smartphone (when having other ICT devices to choose from) is its ability to incorporate the portability of the phone and the functionality of the computer, making it a ubiquitous device usable in many situations. Also, we have chosen another restriction in only interviewing IT consultants working in small to medium-sized companies, so called SMEs, which is a company employing more than 10 and less than 250 employees (European commission, 2012).

Ultimately, what we intend to describe can be formulated as follows:

To what extent do IT consultants, employed by small to medium-sized companies, circumvent stress due to usage of smartphone techniques?



2. THEORIES AND RELATED INFORMATION

In this section we give a report on the information we find relevant relative to our purpose of study. As our problem area can be conceptualized as a composition of separable topics we, for the sake of clarity, present them one by one. In describing our theories, we start off with a short introducing text describing the theory, and finish off with a section discussing the relevance of that specific theory.

2.1 SMARTPHONE TECHNOLOGIES

In this chapter we present the technologies we find relevant for our study, starting with defining what we consider to be a smartphone. We discuss the current trends in smartphone usage, basic functionalities of a smartphone, and finishes off with a quick descent into the background technologies important for the smartphone in our context.

A smartphone is an increasingly more common type of mobile phone, which can be described as a mobile phone with characteristics similar to the ones of a computer. With a smartphone you are, for instance, able to check you e-mail, browse the Internet and add personal functionality by downloading applications. We would like to define a smartphone as “...a handheld computer integrated into a mobile phone” (Encyclopædia Britannica, 2012).

2.1.1 Smartphone usage

Cisco, the large American network and computer communication company, have compiled a prognosis regarding the global mobile data traffic, covering the time period from 2011 to 2016. When the prognosis was released, according to Cisco, only 12 % of the mobile phones were smartphones. Despite this small share, the smartphones yet constituted 82 % of the total amount of data traffic generated by mobile phones globally (Cisco, 2012). This fact indicates how powerful a smartphone really is, given what a user actually can achieve by using it. Furthermore, Cisco's (2012) prognosis points out that, as a result of the steadily increasing smartphone usage, by 2014 *hand units* will stand for more than 50 % of the total mobile data traffic generated (all types of units included). These are figures well worth noting – since the same report states that there in 2011 existed 175 million portable computers that generated mobile data traffic – and that each and every computer itself generated 22 times more data traffic than the average smartphone.

Figure 2 illustrates the expected evolution regarding size distribution between the units that produce mobile data traffic, between 2011 and 2016. As can be seen, the smartphone share is expected to constantly grow, and by 2016 constitute close to 50 % of the data traffic (Cisco, 2012).

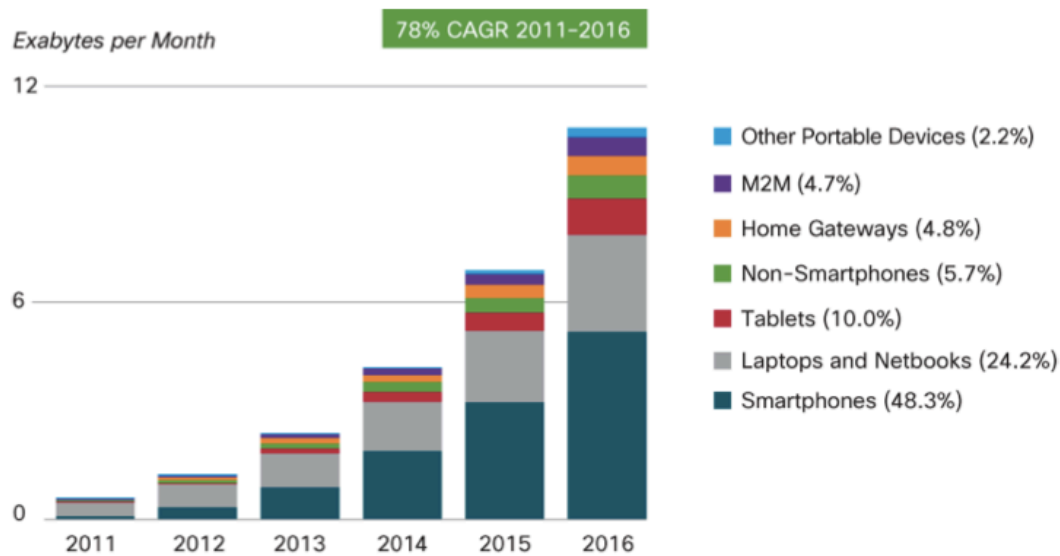


Figure 2 - A diagram visualising the compound annual growth rate (CAGR) of mobile data traffic and size distribution between devices responsible for the growth. Numbers to the right refers to traffic share in 2016.

2.1.2 Basic functionalities of smartphones

Livingston (2004) defines the basic functionalities of a smartphone as voice, messaging, web browsing, extensibility and PIM (Personal Information Management) functionality. PIM functionality is an umbrella term for utilities such as calendars, to-do lists and address books, which is synchronised with a desktop PC or server. Extensibility is generally defined as functionality that allows programs (or applications) to be downloaded and used directly in the smartphone. These functionalities are of course still valid for today's smartphones even though they have evolved considerably. Livingston's (2004) definition of what functionality a smartphone consists of is still accurate, even though the extensibility now is the main feature with utilities like the Apple App Store bringing over half a million applications into reach of the user (Apple, 2012a). These functionalities Livingston (2004) defined are further described in Table 1.

Voice	The voice function, i.e. calling and receiving calls, is the bread and butter of the mobile phone, which also features in the smartphone. This functionality has basically remained the same since the first mobile phone.
Messaging	Messaging has developed quite a bit since the mobile phone where only basic SMS techniques were available. A smartphone of today comes packed with email, SMS as well as advanced text messaging such as iMessage, which seamlessly sends text messages over the internet while appearing as normal SMS messages (Apple, 2012b)
Web browsing	Web browsing is now just about equal in a smartphone browser and a desktop computer browser as Figure 3 displays. Two things are aiding this development; (1) Many sites are redesigned for smartphone sized screens, and (2) the relatively big screens along with an intuitive zooming formula renders the smartphone fully capable of displaying sites that are not.

Extensibility	Extensibility is defined as downloadable content, which interprets into applications that the different operative systems enable you to download from their respective store function. For an iPhone user there are over half a million applications to choose from, which presents almost endless possibilities for the user to customize her phone for her personal needs (Apple, 2012a).
PIM	PIM is short for Personal Information Management and includes e-mail, calendars and contact management among other features. This is standard on every smartphone and on most smartphones it is possible to connect these features to an existing account such as a Google or Exchange, which will further increase its usability (Apple, 2012c).

Table 1: Basic smartphone functionality

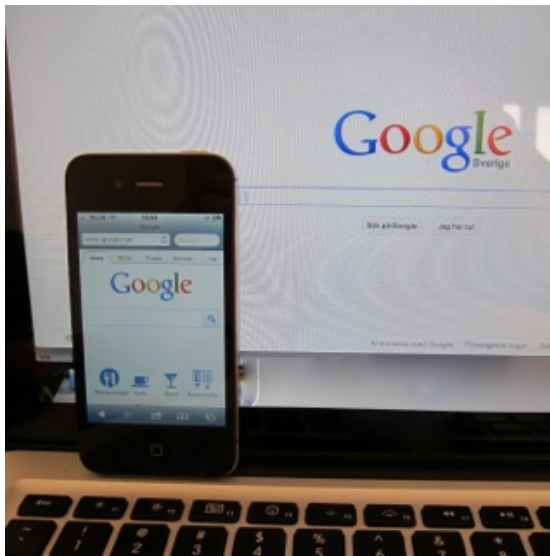


Figure 3 - The similarities between a smartphone and desktop browser

2.1.3 Relevance of study

What is important to emphasise are mainly the distinguishing functionalities that separates smartphones from other ICT devices – namely the powerful functionalities described above – combined with a very accessible portable format. This, along with the fact that most people already carries around a phone gives the smartphone endless possibilities to change the behaviour of people, even more as the user numbers increase.

2.2 COMMUNICATION

In this chapter, we give a perspective on communication. Starting with clarifying what communication really is, followed by a presentation about how to communicate rich information. Finally two common models of communication are defined.

Extensive communicational methods are the result of the above mentioned smartphone technologies. Since a smartphone enables a person to communicate in voice, video and different modes of text such as e-mail and SMS it is a very powerful device when it comes to communication, and consequently we would like to problematize the concept of communication.

Communication can be defined as “a process where persons or groups send or exchange information” (Jacobsen & Thorsvik, 2008). However they argue that communication is so much more than just an exchange of information, and in their own definition they add that communication is not only an exchange of information but of ideas, attitudes and emotions as well.

Jacobsen and Thorsvik (2008) describe a model where communication from a sender moves throughout four steps before it reaches the receiver.

1. The message as the sender intended it
2. Coding of the message (for example language or letters depending on the mode of communication)
3. The actual transmission of the message in the chosen channel (e.g. a letter, words)
4. Decoding of the message as the receiver perceives it.

This model opens up for interpretations of communication as something more than just a mere method to transfer information. According to the model the complexity of problems formed by sending a message will include the sender’s potential opinions and biases, the limitations of the chosen mode of communication and the receiver’s possible flawed interpretations of said message. These problems may not be apparent for the involved participants of any conversation, but they face them nonetheless.

The different modes of communication are another matter that is highly interesting for the involved parties. Jacobsen and Thorsvik (2008) are classifying different ways to communicate into a scale of possibility to convey rich information or not. If a channel of information is considered to be able to transfer rich information is dependent on a number of factors; (1) the ability to transfer as many signals (such as sign language, emotions and interpretations) as possible, (2) the enabling of quick feedback and (3) the ability to let the sender and receiver be personal and adjust the message to each other. Traditionally written or spoken communication has been the deciding factor, but IT is now making this definition less usable. Jacobsen and Thorsvik (2008) are using a model to display different channels of communication, and to what extent they are able to support rich information flowing through, see Figure 4.

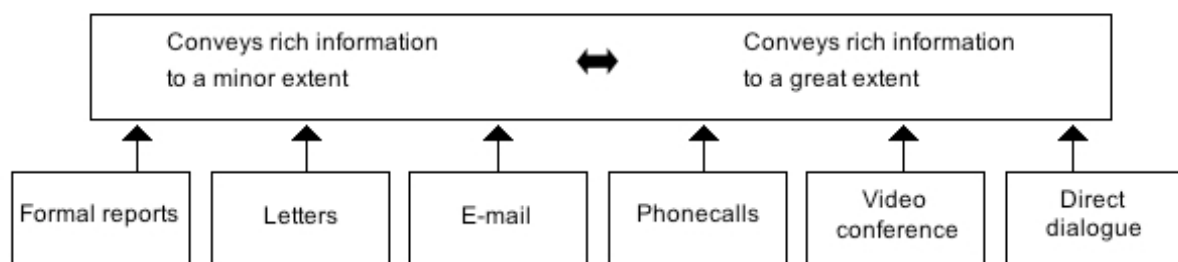


Figure 4 - Different channels ability to transfer rich information (Jacobsen & Thorsvik, 2008)

2.2.1 Messaging methods

There are two modes of communication, asynchronous and synchronous. Examples of synchronous communication are chats and phone calls, both of which can be performed with a smartphone. Email is an example of asynchronous communication (Papazoglou & Ribbers, 2006; Jacobsen & Thorsvik, 2008). A short description of models for handling asynchronous messaging is detailed below.

A first example is called store and forward. In a store and forward mechanism it is the receiver that is responsible for making it known to the server when the message should be sent. The messages are simply queued on the server side and the client requests for this queue to be released and delivered. A second example is called publish-subscribe technology (or push), and is vital for email to be and remain such an effective communication form. The publish-subscribe mechanism caters for emails to be pushed to the client without the client requesting. Instead, the server side recognises that a new email has arrived and publishes this to the subscribers of the service. In an email context, this could be a mail program in a smartphone as well as a different mail program on a desktop computer (Papazoglou & Ribbers, 2006).

2.2.2 Relevance of study

The usage of smartphones gives an extra dimension to the conceptualisation of communication. Reasons for this are primarily that it allows for many communication possibilities, all in the same device – and to handle the whole spectrum of information, as represented in Figure 4. The publish-subscribe communication pattern is also of extra relevance, thanks to its heavy use in e-mail clients and other applications.

2.3 STRESS ASPECTS OF CONSTANT CONNECTIVITY

In this chapter we intend to give a description of what stress is and what happens to a person when stressed. Smartphone related stress, which is of extra interest for us, is also reported on in detail.

Studies show that to always be reachable, through for instance a smartphone, may have negative health consequences. Sara Thomée is a psychologist, at the Sahlgrenska hospital, who, at several occasions, has studied the relationship between cell phone and computer usage of young people and symptoms of stress, depression and insomnia. According to these findings, expectations, from both one self and others, to always be reachable are perceived as stressful. Thomée mentions that it is common to feel guilt and insufficiency when having unanswered calls and text messages. She also mentions that to often be disturbed by phone calls and text messages make it hard to concentrate at a specific task (Västra Götalandsregionen, 2012).

Furthermore, Thomée states that constant connectivity makes the boundary between leisure time and one's occupation vague. Unfortunately, to turn off the phone does not mean these negative effects disappear and you can feel *free* – to make oneself unavailable can also cause stress, due to the possibility of missing out of e.g. important messages (Västra Götalandsregionen, 2012).

2.3.1 Definitions of stress

According to Eriksen and Ursin (2002) stress has four different meanings, which is why stress to many people is a confusing concept to grasp.

- **Stress stimuli (stressors):** Every stimuli leads to some form of stress reaction, not necessarily in a bad way. Which stimuli that can be considered to be stressors is however not defined, but vary for each individual. Each individual can be affected differently depending on psychosocial environment, workplace environment and family relations¹.

¹ Kristina Glise, chief physician, interviewed 2012-04-05

- **Stress experience:** When the brain does not recognise a stimuli it reacts with a general alarm reaction. After the initial reaction of alarm, it recognises what needs to be done with the unknown stimuli, and if it is considered to be unpleasant it is defined as stress. This reaction will vary widely between individuals depending on previous experience of unknown stimuli.
- **Stress reaction:** A stress reaction consists of a general activation of the brain, resulting in increased watchfulness and alertness. After the initial reaction further changes are noticed in the muscles, hormone system and immune system. This activation however is not any different from other stimuli, it is the cognitive containment and the perception of that variance that differs from a normal stimuli reaction.
- **Feedback from the reaction:** The experience of the reaction itself is part of our experience of the situation and it is one of the reasons we feel stressed. How the body reacts can also increase our perceived stress with heightened body temperature, perspiration and increased heart rhythm. This reaction is generating an unpleasant feeling, which is interpreted as stress. An example of such a reaction is stage fright, which may occur when a person is about to perform in front of an audience.

2.3.2 Defence mechanisms

When the body is exposed to a stressor the brain filters these into two different processes; one treats the expectations for a certain stimuli, and the other one the expected outcome of the actions we do in response to that stimuli. The brain stores a large number of these interconnected processes, with the condition that they occur at the same time. For example, if an alarm goes off right before food is presented, both animals and people will put those two stimuli together and learn this pattern. Just imagining something, like a really sour lemon can cause the body to react because these are patterns deeply connected to each other by the brain (Eriksen & Ursin, 2002).

When the body experiences something drastic such as an accident, the brain is trying to defend itself against this unknown threat by minimising, denying or prettifying the problem. This can be dangerous in situations where your life is threatened, since if the brain is downsizing the problem the reaction will neither be strong nor quick enough to avoid the situation. That is why people that are experiencing dangerous situations on a daily basis such as soldiers or parachutist must not have too strong defence mechanisms, because it could in fact be more dangerous to ignore the problem than facing the fear that it is causing (Eriksen & Ursin, 2002).

If you put stress in the context of working Eriksen and Ursin (2002) writes about Krasek and Theorells theory called "Healthy Work". The main idea is that a person with a demanding work with little control of his or her own situation is the most vulnerable to unhealthy stress. A person with great amounts of control over their own work and less demands has a greater chance of developing good health. Control in this context is that the person in question is considering itself being in control of what needs to be done, and that the demands being put on him are within his limits.

2.3.3 Smartphone related stress

Stress caused by the increased usage of information and communication technology (in our case, particularly what regards smartphones) can come in different forms. The boundlessness that a smartphone creates means that it is easy to perform work related tasks in one's leisure time and to do leisure time activities at work. Just this basic effect of smartphone usage can cause role stress, role conflicts and role overload (Thomée, 2012).

Furthermore, stress in relation to information and communication technology (ICT) can, according to Thomée (2012), be described as stress referring to each and one of the components of the acronym:

- In relation to *information*, smartphone techniques have the ability to increase the amount of information available. By information available means both the information one selects to be exposed to (like for instance RSS-feeds, certain updates and e-mail conversations) and the information that one is exposed to whether it is desired or not (such as bulk mail and advertising). This situation is commonly referred to as information overload. Research on the subject has shown that the effects of information overload are difficulties separating important from unimportant information, uncertainty, decision-making difficulties and unnecessary time-consumption that also causes reduced productivity. In terms of information itself, both quality and quantity are of importance – since stress symptoms are caused by the great external exposure and the symptoms are worsen if the exposure is considered unattractive.
- In respect to *communication* a common cause of stress is the ability to communicate by several means simultaneously (with a smartphone one can for instance, with the same device, communicate through chats, SMS, e-mail, voice, video calls). This diversity of communication can be mentally demanding, and cause stress due to distractions and dual tasking, that strains the human working memory. Special emphasis has been put on e-mailing, that can be seen to cause stress and both communication and information overload. Research proves that e-mailing is stressful because they pile up while doing other activities and they blur boundaries between private and professional life. In fact, regardless of actually receiving much e-mail, the technique can generate stress anyway. The pure receiving of e-mails can act as stress-causing interruptions, which negatively affect productivity and time-utilization, and most likely creativity as well.
- What regards *technology*, increased stress can be the result of, for example, frustration, hardware problems, software problems and slow response times. These stress types may also increase due to a greater technology dependency – a phenomena referred to as *technostress*. Besides heavy reliance on technology, other relevant aspects of technostress are said to be constant development, changes and upgrades of technology. Furthermore, self-efficacy is an important stress aspect in relation to technology – where the individual ability to handle the technology affects how we respond to problems, in terms of for instance stress.

In 2011 a study, by Thomée, Sörenstam and Hagberg, concerning the relations between mobile usage and mental health among young adults, was published as an article. This study resulted in associations between negative mental health outcomes due to mobile phone exposure. In this context mental health outcomes comprise stress, sleep disturbances and symptoms of depression. These results were calculated based on two questionnaires, distributed with a one-year-gap, which were answered by 4156 young adults in total (only including respondents answering both distributions). 1455 men and 2701 women answered the first questionnaire sent out – and the result presented in the article are of special interest for our study. The questionnaire consisted of quantitative questions regarding how many

phone calls and SMS messages an individual sent and received. It also consisted of more qualitative questions about for instance an individual's perception of availability demands, accessibility stress and feelings of overuse.

Figure 5 visualises some of the statistics based on the first questionnaire, brought up by Thomée et al. (2011). Some interesting patterns are shown. For instance, approximately half of the respondents, both males and females, were classified as *low users* based on their usage of phone calls and SMS messaging – and they regarded themselves, to a low extent, as overusing their phones. Despite these rather modest classifications of high usage and perceptions of overusing, a disproportionate large share felt they needed to be available and that the accessibility was stressful.

MOBILE PHONE USE			AVAILABILITY DEMANDS		
	Men	Women		Men	Women
Low	55 %	53 %	Low	27 %	34 %
Medium	22 %	23 %	Medium	47 %	42 %
High	22 %	24 %	High	27 %	24 %

ACCESSIBILITY STRESS			OVERUSE		
	Men	Women		Men	Women
Low	61 %	46 %	Low	84 %	71 %
Medium	29 %	40 %	Medium	13 %	22 %
High	10 %	15 %	High	3 %	7 %

Figure 5 - Statistics showing quantity of use and perceived mental effects

2.3.4 Relevance of study

In the context of our thesis the smartphone acts as an intermediary that presents stimuli with the possibility to cause stress. Whether stress is caused by an overwhelming workload is secondary, the role that the smartphone plays in the distribution and redirecting of the actual workload in a continuous stream is the important part.

Out of the patterns, mentioned in 2.3.3, one can assume that the mobile phone in general and the smartphone in particular (with its greater communicational possibilities) have the ability to not be perceived to be used too much, but nonetheless entail characteristics that may trigger stress reactions. The technology can be seen as somewhat powerful in this respect.

Furthermore, Cisco's (2012) report that indicated a growing share of smartphones regarding global mobile data traffic can be seen as an indicator of growing usage of the technique itself. Thus, in the future the usage patterns shown in Figure 1, are most likely to be increased and the smartphone can be expected to be an increasingly protruded technology.

2.4 WORK ENVIRONMENT THEORIES

In this section, a theoretical base of work environment theory is presented. In relation to our question at issue, these theories are of value, since the smartphones are becoming an increasingly prominent aspect of the working life.

Much has been written about what constitutes a good working environment. Questions about what is important for an individual's job satisfaction have been central for the industrial psychology field since its start in the last century. In the beginning, researchers stated that the most important issues for achieving job satisfaction concerned the work environment's qualifications – like for instance lighting, noise levels and length of working and resting periods. A viewpoint transformation then occurred, focusing on the *social* aspects of the work environment. According to these theories, job satisfaction is highly dependent on individuals having a specific social position and function – to be needed in a specific social role, and also to be appreciated by other persons belonging to that group (Rubenowitz, 2004).

Recent research points out that, beside the social aspects of the work environment, *work commitment* is a vital aspect to achieve daily job satisfaction. Work commitment can be described as experiencing daily work as meaningful and having the opportunity to affect one's own work situation (Rubenowitz, 2004).

2.4.1 Introduction to human needs and motivation

When discussing job satisfaction reasoning is often based on psychological theories of human needs. Humans have needs – some of which are congenital (physiological) and others that are affected by our targeted ambitions, so called acquired needs (Rubenowitz, 2004). The American psychologist Abraham Maslow's theories are prominent in the area – and he stated that physiological needs include the most basic criteria that need to be fulfilled for a human to survive such as sleeping, breathing and eating. The acquired needs, on the other hand, vary by the degree of psychological maturity, where the highest goals are described as self-actualization (that is a person's will to realise its full potential – in terms of, for example, wisdom). According to Maslow's *motivation theory*, people are motivated by unsatisfied needs (Abraham Maslow, 2012).

Maslow meant that a hierarchy of needs exist, visualised in Figure 6, where the basic needs are placed at the bottom (Abraham Maslow, 2012). Moving up the hierarchy, gradually, more physically mature needs are located. As an individual matures the needs that person is motivated to fulfil also develop accordingly. However, a lower hierarchy need has to be somewhat fulfilled before a higher hierarchy need can be aimed for (Rubenowitz, 2004).

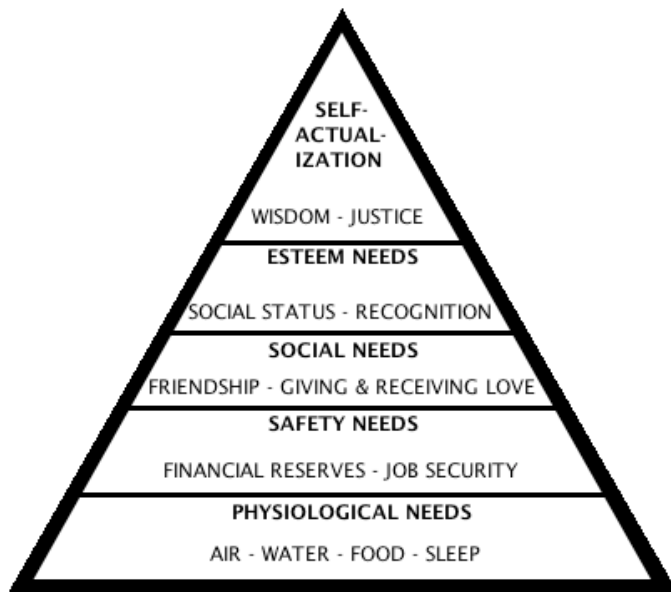


Figure 6 - Maslow's hierarchy of needs. In bold, the different needs categories. In plain text, examples of motivators that have to be fulfilled in order to strive for a higher type of need.

Positive external conditions, that contribute to lower hierarchy needs being fulfilled, create possibilities for a favourable personal psychological development. For an individual, the optimal physical and social environment can therefore be described as the type of environment that makes it possible to satisfy the needs that are perceived as most intense and to strive for higher hierarchy needs (Rubenowitz, 2004).

2.4.2 Human needs and motivation – impacts on job satisfaction

Based on the theories of human needs and motivation, an employee can be said to strive to achieve many different goals. What needs employees try to satisfy is highly dependent on their material and social standard of living. Most job sites nowadays do provide an environment (that direct or indirect is) able to fulfil the most basic needs, like having a home and permanent employment. As a consequence, more and more employees demand jobs that are *meaningful* – jobs that make it possible for them to fulfil needs that are more psychologically mature, like self-actualisation (Rubenowitz, 2004).

According to Rubenowitz (2004), to be able to fulfil these higher hierarchy type of needs employees require work sites that make it possible to:

- Have self-control over working methods and pace, without too much control from management, technique, colleagues and payment methods.
- Get acknowledgments and obtain a social status. This can be achieved through, for instance, the permission to be responsible for one's own work tasks and influence one's own work situation regarding planning and important decisions.
- Develop and learn during work.
- Have physical freedom of movement and a work organization that offers social contact and fellowship with colleagues.
- Be provided varying and manageable tasks. This allows both for a person's abilities to come in to play and for personal initiative making.

2.4.3 Relevance of study

In relation to our question at issue, we find certain aspects of the human needs and motivation theories extra relevant. To begin with we believe that our study population, namely IT consultants, personify the types of persons that aim for higher hierarchy needs. Reasons to believe this are that IT consultants, beside their employment, typically have a solid education and a place to live – thus, the lower level needs can be expected to already have been achieved, and the educational background may serve as a driver to learn more. This fact makes the work site characteristics for satisfying higher level needs, mentioned in section 2.4.2, appropriate to apply to our study population.

Furthermore, these job satisfaction characteristics are very suitable to put in contrast to the many technical aspects of smartphones mainly because many smartphone technique characteristics are contradictory in relation to the compound context of stress and job satisfaction. Contradictory in a sense that these techniques can be interpreted as means to fulfil job satisfaction, while they at the same time, according to research, cause stress and therefore can be seen as harmful.



3. METHOD

According to Patel and Davidsson (2011) the choice of research method is an important consideration – but it is also imperative to adapt the chosen data gathering method making it conform to the problem area, the question at issue and the time available. Apart from discussing the data gathering method, this chapter will describe our study population and analysis method as well.

3.1 CHOICE OF DATA GATHERING METHOD

We have used an empirical approach to research. There are different empirical methods to choose from – we have used a type called ethnography. Ethnography as a research method is used to understand peoples' lifestyles and specific cultures (Patel & Davidsson, 2011). It is originally used within the social and cultural studies where a researcher spends a significant amount of time in the field. Ethnography is now however adapted by information technology researchers for the purpose of explaining how information systems affect users in their everyday lives (Myers, 1997).

Our method of choice to perform the ethnographic study is to conduct qualitative semi-structured interviews. Semi-structured interviews can be placed in the middle of a scale ranging from, at the one extreme, posing only closed questions that generate pre-defined answers, to, at the other extreme, asking solely open questions that generate very individually dependent unstructured data. The strength of semi-structured interviews is its ability to utilise the advantages of the both extremes. Strengths in respect to closed questions are the possibility to impose *a priori* structure to the answer alternatives, which in the data analysis activity enables the researcher to more easily compare different respondents' answers to each other. This also makes it possible to in a quantitative way see statistical connections between respondents. Unstructured interviews on the other hand permits the respondent to give a highly personal answer, and for the researcher to get insights not thought of earlier. This causes a very rich and diverse information result that potentially does not give a precise answer to the original question as expected by the researcher. The semi-structured interview incorporates both these approaches, and uses the positives of these two when applicable. We used semi-structured interviews as they are commonly used, thus divided the interview framework (attached as an appendix) into different sections, containing both open and closed questions in a hierarchical structure – starting with open questions followed by closed ones. The advantage with this structure was that the interviewee got to express personal opinions more openly first, and we got closed questions, with short concise replies answered towards the end (Sharp, Rogers & Preece, 2007).

3.1.1 Pros and cons with a qualitative method

According to Backman (2008), when writing a thesis with a qualitative perspective the context that the thesis processes is subjectively looked upon. Thus, what this viewpoint means is that the context of interest is individually constructed and the focus is how we perceive this reality. Compared to a quantitative perspective, where a given context is objectively looked upon and processed, a qualitative perspective focuses on how individuals interpret and shape their reality (in this case IT-consultants ways to prevent stress through smartphone usage). As Patel and Davidson (2011) describes it, an empirical research method is *inductive*, meaning that it is supposed to neither verify nor falsify an existing theory, but rather to create a trustworthy local theory, out of experience, that holds true for a particular group, situation, belief or culture.

The qualitative process of research is less standardised and more flexible than the quantitative, a fact that contributes to that the result generated can be very varying. Variations depend on, for instance, what literature one reviews and what is perceived as important, how the research question is formulated, how data is analysed and how results are presented (Backman, 2008).

In our case this means that our result is somewhat unique due to the varying factors just mentioned. Our conclusions are local and highly dependent on with what theories we have underpinned our data gathering activities with, which subsequently influenced our analysis. Furthermore, the study population contributes to our insights as well – meaning that if we had chosen population differently another result would have been likely.

The major benefit with our choice qualitative method, though, is that it is very suitable for our question at issue. Patel and Davidson (2011) state that qualitative research methods is appropriate for questions that intend to explore, interpret and understand humans' experiences and patterns for causes. This qualitative approach has given us freedom to let our generated results be very describing and shaped by rich descriptions given by our study population. Our conclusions are in that sense less influenced by static frames of references.

3.2 STUDY POPULATION

Our study population consisted of six persons – five males and one female, all in ages between 25 and 35. These six persons were – as earlier mentioned – solely IT consultants. IT consultant is an umbrella term, that we define as a person whose work could include tasks varying from performing pre-studies, implementing, supporting and maintaining in relation to an IT application, system or solution.

We chose to contact three different companies, all working within different fields. The first company works with business process management – which means mapping and improving business processes, using a self developed IT application. The second company are in the transport sector, having created a system for managing supply chains. The third company is active within the business intelligence area, providing a well-known standard application for its costumers. We interviewed two consultants from each company.

The consultants all have different job assignments, varying from doing workshops with customers over a number of days, to configuring existing systems from a distance. In our study population there are three consultants that on a regular basis visits customers, performs customer workshops or pilot studies and are in many ways away from their home office most of their time. Furthermore, another two consultants do these type of missions on a less regular basis, but it still happens on occasion. These two consultants are mostly in their office, configuring systems as their main occupation but are still out of office every now and then. The last consultant is in less contact with customers and can resulting from this plan his day according to his own needs. His main tasks are answering mail and keeping everything up and running, and he can perform these duties both in his office or anywhere else.

3.3 DATA GATHERING

During the interviews, that took place at the consultants' company, we used pre-arranged questions sheets (attached as an appendix) to structure the sessions. These question sheets were divided into sections – where each section contained questions related to each other and to a specific main topic, such as *pros and cons with smartphone usage*. Each session took approximately 15 minutes to conduct and to not miss out of any important information we recorded all the interviews, with dual recording devices. The interviewees allowed all recordings. Notes were not taken – an active choice of ours – since we wanted to converse with our interviewees, in a natural way, with as few distractions as possible. As a way to prepare the data gathered for analysis, and partly as an initial analysis activity, we transcribed all the interviews with fine grained accuracy.

In our interviews we started focusing on the usage of the smartphone, under the topic *private and professional use*. In this section our main goal was to discover patterns of usage such as specific applications, amount of usage throughout the day and other basic information about the consultants usage. When these initial discoveries had been made we moved on to *pros and cons with smartphone usage*, discussing the initial discoveries such as application usage but with the addition of their opinion about the effects. When discussing the potential benefits with smartphone usage, we also compared with the potential absence of a smartphone and how their daily work would have functioned without it.

In the next section we immersed into stress and constant connectivity under the topic *connectivity and stress*. In this chapter we started wide open with the interviewees view on stress in general. We then aligned more towards smartphone stress in particular and focused on whether or not the consultants considered the smartphone as an aiding or inhibiting device in their working lives.

The last section, *summarising yes/no questions*, we added to straighten out potential ambiguities, and making sure we had not misinterpreted any of the previous questions. The intention with these questions was to amplify the patterns within the open questions, and to separate the consultants' views in a concise manner.

3.4 ANALYSIS METHOD

Sharp et al. (2007) describes three ways of conducting analysis on qualitative data – namely identifying recurring patterns and themes, categorizing data and analysing critical incidents. Out of these methods, we chose to analyse by identifying patterns in our gathered data. Sharp et al. (2007) states that to be able to identify patterns in qualitative data one needs to be immersed in the data and that patterns tend to evolve over time – as one gets more and more familiar with the data.

A major challenge during this agile activity is to identify patterns that are not overlapping each other regarding its content. Furthermore, an important aspect is focusing on getting the granularity of patterns on a, for the given material, reasonable level. The challenge in this respect is to, on the one hand, not getting to many patterns with very few members and, on the other hand, not getting to few patterns with to many members, not forming a coherent mass of content (Sharp et al., 2007).

To establish our patterns we have worked according to a model, depicted in Figure 7.

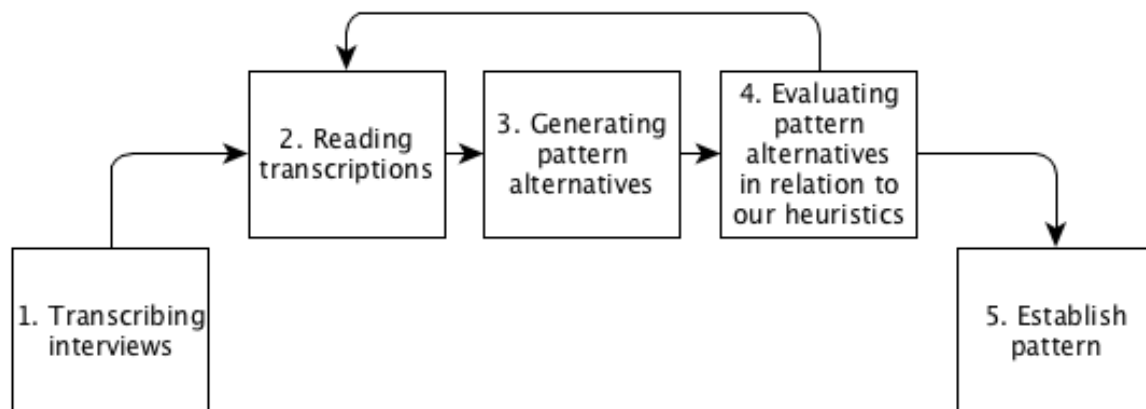


Figure 7 – Our method of generating patterns.

As Figure 7 shows and as mentioned above, an initial first analysing step for us, were to transcribe the recorded interviews – which gave us both a total recap from the interview sessions themselves and a text base easier to perform on going pattern identification activities with. After the transcribing activity, the *real* analysis began. Numerous iterations between three main activities lead to an established pattern. The first activity, number two in the figure, was simply to read the transcriptions. After doing that, the second activity (number three) was to generate a possible pattern, answering our question at issue. Thirdly, having a possible pattern at hand, we evaluated this in relation to heuristics (see section 3.4.1) – activity 4. If fulfilling our heuristics the pattern was established.

3.4.1 Pattern heuristics

In our efforts to form patterns that are not overlapping we have decided to split our main occurrences, into a number of different patterns based on specific heuristics. These heuristics are as follows; (1) No requirement that every consultant have to fit into every pattern, (2) No consultant can oppose a pattern, but they do not have to explicitly state that they agree to all of them and (3) Every pattern is supported by at least two consultants. We are now going to break down these heuristics and discuss the complications they bring.

The first heuristic is that every consultant does not conform to every sub pattern, even though they all fit in the corresponding global pattern. This have resulted in that even though every consultant in some way do not disagree with the sub pattern, it is an impossibility to use quotes from all six consultants as an example for one sub pattern. Hence, we have used the consultants most suitable, displaying quotes that are relevant for each sub pattern.

Secondly, no one in our study population is negative to any of the patterns, even though not all of them fit into each and every one of them. A way to work around this would have been to stick to those patterns that every consultant agreed to, but that would also have reduced the possibility to separate different consultants views on the issues at hand to a minimum. This is therefore a conscious decision we have made to give more depth to the result.

The last statement is to ensure that the patterns we categorised withstand scrutinising, as a consequence of the dividing of patterns. Even though all consultants agree to the umbrella patterns, we still feel that at least two consultants are needed to form a sub pattern. This ensures that the pattern is neither global, nor too small to be included. Most of our patterns have at least three consultants that clearly conforms to it, however we still included two patterns with only two consultants because of these patterns significance.

In describing the patterns we have decided to use quotes that is suitable for that specific pattern, and withhold those quotes that is neither for nor against. This is a consequence of the fact that the separating of the global patterns into smaller sub patterns resulted in more wide spread opinions. The main reason for splitting up the global patterns was that we discovered that the even though every consultant conformed to them, there was a number of ways that led to that fact. Instead of grouping these into one, we wanted to present these differences, hence producing sub patterns.

3.5 PRESENTING THE RESULT

We have chosen to divide our result into two separate chapters, *Theory conformity with study population* and *Stress avoiding patterns* in order to simplify for the reader. In chapter 4, *Study populations' conformity to the theory*, we present our initial findings regards to the study populations agreement with the theories, that functions as a foundation for our further analysis. In the next chapter, *Stress avoiding patterns*, we use the base provided in chapter 4 as a stepping stone for our deepened analysis concerning how the IT consultants of our study population circumvent stressful situations.



4. STUDY POPULATIONS' CONFORMITY TO THE THEORY

As an introduction to and underpinning of the result of our question at issue, we describe how our study population conforms to the theory base (presented in section 2) that influenced both our data gathering and analyse activities. This section, thus, describes the characteristics of our study population – characteristics that had a major influence on our resulting insights and conclusions.

4.1 SMARTPHONE DEPENDENCY AND USAGE PATTERNS

A first meaningful consideration regarding the consultants' usage is that five out of six determinedly answered yes when asked if they perceived to have a dependency towards their smartphones – and the sixth answered no thoughtfully, but did not rule out a possible dependency. A measure of this dependency can be described as all six consultants having their smartphones turned on 24 hours a day – and all agreed on having to turn back and get their phones if they happened to forget it at home when leaving for work. Thus, none of the consultants believed they could manage one day without having their smartphone at hand – a fact well described by one of the consultants:

“... no, one day without the phone at my job would not work for me, in that case I'd be stressed”

Another aspect in this matter is that all consultants are using the same smartphone for both professional and leisure time use – solely because it was perceived as cumbersome and impractical to have two devices. However not investigated in greater detail, we have identified this fact as a contributor for distorting boundaries between work and leisure time, making the impact of the technique even more prominent. Moreover, all consultants positively answered that they used their smartphones to answer job related issues at leisure time.

Furthermore, the increased speed of – and expectation of rapid – communication enabled by the smartphone is seen to somewhat strengthen the dependency and to some extent affect the work patterns of the consultants. Many of the consultants mentions that they find it important to give quick answers to customers or partners and that they value the possibility to in a continuous way answer phone calls and especially mails during the day, and particularly when having a little time gap. The communication patterns, affected by smartphone usage, can be seen as more synchronous in this perspective.

Moreover the term *usage* is somewhat specially conceptualized when discussed with the consultants in relation to smartphones. When asked how much they are using their smartphones on a daily basis the absolutely most common answer were around-the-clock. This perception of the term gives an understanding for the smartphone's ability to *intertwine* with its environment. With just one exception all the consultants expressed this around-the-clock usage – which is interesting because it is not likely that all the consultants who have this perception of usage is actually *using* their smartphones constantly, except when sleeping. Rather, just to have the smartphone at hand when awake, being able to use it when needed is perceived as usage – and not just when the smartphone is actually actively being used.

4.2 SMARTPHONES' CONTRIBUTION TO JOB SATISFACTION

As mentioned in section 2.4.2, we reported on a couple of work site characteristics – described by Rubenowitz (2004) – needed for an individual to reach for higher hierarchy human needs. The most relevant of these in a smartphone context showed to be the appreciation of freedom of movement and individualization of one's work, but also self-control over one's working methods to some extent. These were apparent patterns of smartphone enablement and impact, which all consultants thought were a positive aspect of their work environment. As exemplified by three consultants:

"You don't always have to be in place [at the office]. I can possibly receive mail in another location and I simply feel you get more freedom. You have access to information, also at a distance."

"If I just have it [the smartphone] with me, I can be anywhere".

"... Of course you would've managed and solved them [work tasks] in other ways, but it would've been considerably more cumbersome. [...] Without it [the smartphone] I wouldn't be able to work the same way I do today."

4.3 SMARTPHONE USAGE AND STRESS

In relation to Thomée's (2012) conclusions about information and communication technology and their stress generating effect, we have seen some confirming patterns – like for instance some consultants' descriptions of their usage certainly fitted the description of communication, information and technology stress. Regarding information stress one of the consultants, for example, expressed signs of stress due to information overload:

"... instead of just letting go of a task and take care of it when you get back to the office or when having access to a computer you can process these [tasks] constantly [with a smartphone]..."

While another consultant expressed obvious signs of stress due to communication, in this case due to mail communication:

"... the mail inbox can be rather stressful. If you've been away somewhere, on a meeting or the like, and not been able to handle them [the e-mails] and you return and there are 15 of them piled up – that's tough."

A third consultant described a stress reaction, fitting the description of technostress:

"... it [the smartphone] has been broken for a year, but I haven't fixed it, because I don't think I could've managed without it for two and a half week."

Though, somewhat contradictory to Thomée's conclusions about the actual usage and exposure itself being the generator of stress – we discovered that it was rather common amongst consultants to not share this view in total. A common belief was that the usage of smartphones contrariwise prevented the consultants from experience stress and rather was a means to shield oneself from stressors. With the expressed dependency in mind, the

smartphone usage amongst the consultants is “adjusted” to constitute a means to gain control over for instance information flows, demands for availability, communication with contacts and handling of tasks. This control also was expressed as the self-controlled option to turn the availability off when experiencing too much activity – but nonetheless, only be a quick phone setting away from resume connectivity. The consultants, though, solely agreed that it was a stressor when the self-control over the smartphone usage was taken away from them, for some reason – such as having problem with the mobile reception. As exemplified by two consultants:

“I reluctantly have to admit that something of the most stressful is when you’re someplace where there’s no reception for your phone.”

“... I’d say that I experience more stress when I can’t check my emails...”

Even though our study population, as just mentioned, did not in total agree with Thomée’s conclusion about the stress generating effect of information and communication technology itself – another pattern was apparent, namely the smartphone’s ability to amplify stress originating from elsewhere (especially from workload related to the consultants role as an employee at a given company). Many of the consultants reported on perceiving stress reactions when having “too much to do” at work and that this were strengthened by the smartphone, by for instance its ability to enable constant connectivity in a portable format, as one consultant puts it:

“If you are in a period where there’s very much to do, you experience that its very busy at work and when you come home it continues – perhaps you receive emails.”

Figure 8 visualises a summary of how our study population perceived stress reactions due to lost control, consequently affecting the otherwise positive usage experience.

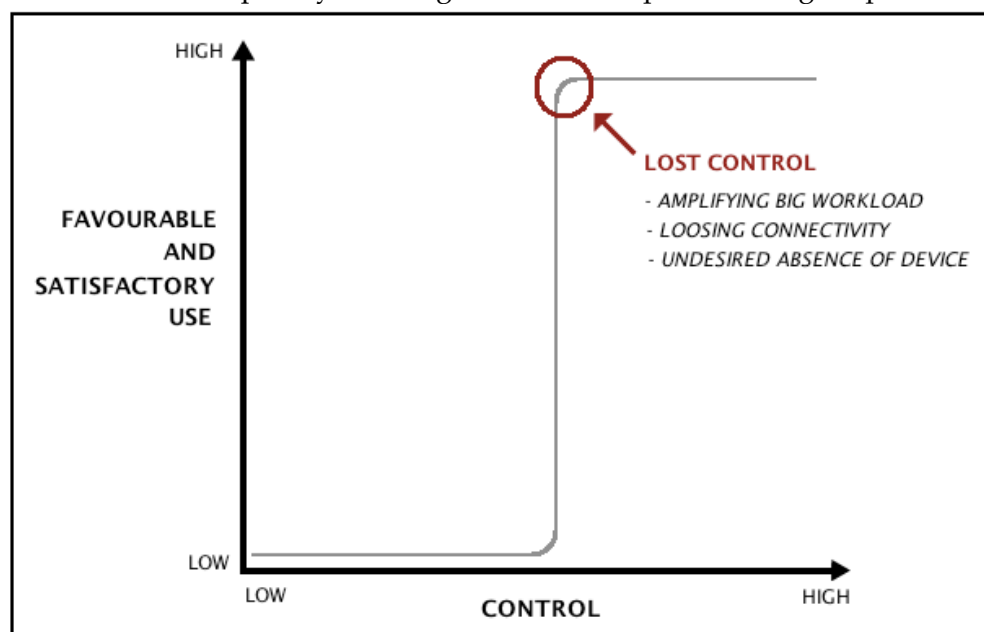


Figure 8 – The relation between loss of control and a satisfactory user experience.

Thus, the main conclusion regarding their usage patterns is that the smartphone is considered a helpful, nimble and much appreciated tool, whose importance for the individual is strengthened by dependency – but that this favourable and satisfactory use is eliminated when control is lost. Once control is lost, as the red circle in Figure 8 shows, the positive aspects of the smartphone is said to rather drastically diminish. The scales on the diagram are highly arbitrary and serve purely as a means to express our study populations' characteristics in a visual manner. An example of lost control, which leads to an unpleasant user experience, is given by a consultant:

“At my previous work I received 120 to 130 e-mails a day, around the clock. That wasn't very pleasant and I actually stopped using my phone for handling e-mails. That was a more stressful situation – now it rather feels good, to have control over what's going on.”

4.4 SUMMARISING ASPECTS

In relation to our theory base it is important to emphasise that the study population mutually have very intense usage behaviour exemplified in various forms above. These usage patterns brings along new expectations on communication, unique conceptualisations of what is considered to be usage as well as the diminishing of boundaries between work and leisure time. Regarding job satisfaction, smartphones proved to contribute primarily by offering freedom of movement and individualisation of one's work. In relation to stress, the study population expressed that stress often was stemming from lost control of usage.

These aspects are supporting the developed patterns presented in the subsequent chapter, by displaying the major characteristics of the study population regarding stress, usage and job satisfaction.



5. STRESS AVOIDING PATTERNS

On a high level, what we have discovered – based on our study populations’ usage behaviour of and attitudes towards smartphones (described in section 4) – is that, with all consultants perceiving some sort of dependency, to use or not use was not a question of negotiation. Rather, they all found it very useful, but also expressed in different ways how the smartphone had an ability to generate stress and amplify big workloads and so on – if not *used right*. Which brings us to the major insights regarding our question at issue, which we in detail will describe in sections 5.1 and 5.2. The right usage that we have identified can be broken down into two major categories, namely *active* and *passive* approaches for avoiding stress.

To clarify the reasoning – before presenting our active and passive approaches for avoiding stress – we have identified that the consultants, more or less, constantly as a consequence of having the smartphone at hand are exposed to stressors of different types (like for instance rich information flows). These stressors can turn into stress reactions, if control (as mentioned in section 4.1.3) over the stressors is lost – perhaps due to amplifying a too big workload. To control the stressors and exploit the benefits of smartphone aspects, we have identified that the consultants are using passive and active approaches. Active approaches, as the definition implies, are usage patterns that to a greater extent is individualised by a specific consultant – like for instance different ways of multitasking with the smartphone. Passive approaches, on the other hand, are patterns that are more general and static for the whole study population. Passive approaches are, for example, about how to leverage availability and constant connectivity as a means to avoid stress. These patterns just mentioned are in the following in more detail reported on.

5.1 PASSIVE STRESS AVOIDING APPROACHES

The most recurring all-embracing pattern we have found that IT consultants do, whether consciously or not, is control. Loosing control of the situation is the first path leading to stressful situations and stress reactions². The IT consultants in our study population use their smartphone in every possible way to remain in control, and most of them encourage the constant information flow that will maintain the perception of control. Below we have listed three different patterns that either lead to or is the result of control, the interviewees’ way of responding to the potential stressful situations that occur in their everyday work life.

5.1.1 Flow of information

The first, and most important pattern of control is the flow of information. The consultants in our study population want without exceptions to have a constant information flow to their smartphone. Most of them use push technologies to constantly receive information directly to their smartphone without delays, both to their calendars and email inboxes. One example of this is what one consultant replies when we ask him if he thinks the smartphone in any way contributes to stress:

“No I wouldn’t say so. I rather think, when you are in periods where a lot of things are going on, a little out of control, that it is really good to have the constant information flow. [...] So I feel like, it [information flow] is more good than bad for me personally.”

² Kristina Glise, chief physician, interviewed 2012-04-05

The same consultant is continuing the argument about constant connectivity and information flow, considering how the stress reactions have changed over time:

“Before one stressed because there was too much incoming information and that caused stress, now however it is more information, and when you don’t have access to information that causes stress, because it is so easily accessible in comparison...”

The flow of information is very important to remain in control, and remaining in control is very important to master the potential stress situations that arise. The constant flow of information can be distracting when working on something else, but in general the consultants find the tiny interruption of an email as worth it to get the information and remain in control of what happens:

“...But I can also understand that people get ineffective because they get stressed of it [incoming mail] [...] because you break up from what you’re currently doing and change focus. But personally I find that a good thing. I simply want that information”

The constant flow of information allows for consultants to constantly be up to date with what happens, but also to make other stakeholders aware of what they need to do, or to redirect important information straight away. One consultant is asked about smartphone related stress and he informs us of his way to avoid stressful situations:

“...If you relate it to the smartphone that means you always have the opportunity to contact that person [e.g. a customer] or send, send the question to where it is supposed to be, so that it is at its rightful owner to move on [...] I would say that I lessens stress at work to have a smartphone accessible”

In this statement we can see that the consultant is using the constant information flow to redirect messages and make sure that if anyone else needs to do something before the process of the project can continue, that person gets to know that as soon as possible. In this way the consultant can focus on other things or projects until that person replies with the necessary information. The information flow is something the consultants are very used to and find necessary to work in the way they want to. We asked one consultant what would happen if he only had access to a phone limited to calling and sending SMS:

“I would probably have missed the emailing and maybe... I would have felt inhibited by it. I would’ve missed the access...”

In summary, the consultants in our study population are feeding of this information flow, and have adapted their work in great length to the constant stream of incoming data. Without it they instantly start to experience stress, and feel less efficient in their everyday work tasks.

5.1.2 Accessibility

The second passive pattern that simplifies and relaxes the study populations' life is the pattern of accessibility. With the possibility to be constantly connected to their colleagues and customers as well as their friends they feel that the stress is releasing due to the increased control. The accessibility pattern enables the consultants to be more flexible in their work and still feel in control. We asked one consultant what he felt was the upsides with being able to not be limited to one place, but rather be geographically flexible:

"The upsides is that I don't always have to be at the place [the work place], instead I can receive email at any other place and I feel that I get much more freedom due to the fact that I can access information at a distance"

This consultant is clearly feeling the relief in being able to access information anytime, anyplace and thrives in the flow of information, as thoroughly discussed above. However the consultants accessing information at any given time is only one of dimensions of accessibility. The second side of accessibility is the possibility to be accessed anytime, everywhere. We asked one consultant why he decided on having his private and work phone merged into one:

"Of course that means that I am accessible at all times, which is good for the company I work for [...] But I don't feel any stress because of that. I think it is fine, if I need to help a colleague in need I don't mind even if it's after 5 o'clock"

When asked further what the smartphone brings him in terms of positive effects he continues on about the availability factor:

"I guess that's the same again, if I'm away from the computer I'm still accessible via mail and telephone"

That one of the positive effects of smartphone technologies is the prospect of being constantly accessed is clear from what many of consultants say. Another consultant replies like this when asked if he feels pressure from his colleagues, friends or family to be reachable constantly:

"No, I wouldn't say that I feel pressure, however I always try to be, but not because anyone else is expecting me to"

This tells us that the consultant decide to be constantly connected not because he feels the need to be, but because he choose to. Furthermore, it once again comes back to controlling the situation, whether it is on their spare time, vacation or in their work. When the consultants feel that they have control over the situation they do not feel stress, and the possible extra workload is much more bearable than not knowing what is happening at that particular moment.

5.1.3 Freedom of choice

The last passive correlation we have found in the usage of smartphones is the pattern of choice. This revolves around the fact that even though the constant flow of information is positive for most interviewees, some of them feel that they rather receive the information when they choose to instead of in a constant stream. This allows for the same information to be received, with the one difference that it will be read at the convenience of the consultant rather than the sender. The consultants can still feel the same amount of control, and at the same time focus on their current tasks without being disturbed. One of the consultants that have chosen to deactivate push technology in his email client answered like this when asked if the smartphone helps him to tailor his work after his own needs:

“Yes, I’d say so, partly because I can actually, since I don’t have push technology, choose myself when I want to receive them [the email], and in that way decide when I receive the information and check for emails or not, and in extension it allows me to work from anywhere...”

This is still showing a great need to remain in control, but at the same time decide when to receive that information. The key here is that the consultant still feels stress if he can not access his email, it is the knowledge that he can check his email at any given moment that keeps him relaxed. This statement is based on that the same consultant that above indicated that he did not want to receive emails all the time, still states that he wants to be able to check his email at any time:

“In relation to the smartphone I’d say that I experience more stress when I can’t check my emails, than when I can actually receive them and see what is there.”

Furthermore, another fact that is clear from the interviews is that the smartphone amplifies the workload if it is too much for one to handle. As one consultant answers if he has activated push technologies in his smartphone email client:

“Yes I have, but from time to time when I have been using a smartphone I have deactivated it to be able to relax after work hours. But if goes that far I think that you have too much to do at work”

Another example of this is from another consultant talking about his last position where he received more than a hundred emails every day. He discusses the fact that the smartphone is amplifying that workload:

“...So I think that, in sensible amounts, that the smartphone is really good. But it can of course get pretty wicked if it isn’t used in reasonable amounts”

The last statement is from a consultant that values both spare time and the information in combination, and chooses to receive emails at his own convenience instead of anyone else’s:

“I haven’t synced my phone, because I don’t want to, some customers likes to email all through the night and I don’t want to receive those emails, so I can check those emails at work instead”

The information is still valuable, but the timing of the email is simply not appropriate for this consultant due to for example time zone differences, and the most suitable choice is therefore to deactivate the synchronisation of emails. Emails are key in the freedom of choice chapter, with its great penetrating power in work situations. Most consultants find it preferable to receive these emails all the time. However, for those consultants that do not find it convenient, the information flow is not disconnected but rather adjusted to suit the recipient.

5.2 ACTIVE STRESS AVOIDING APPROACHES

In their efforts to avoid stressful situations, the IT consultants are actively changing their behaviour to eliminate situations in their work and everyday lives that could cause stress. The smartphone, with its mobility and similar functions to a stationary computer, facilitates these changed work patterns letting the consultants change their behaviours adapting to their work life needs. These behaviours, in relation to the smartphone, enable them to work more efficiently and in that way make sure that stressful situations never occur. We are breaking these active changes of behaviour into three different branches, discussing them in greater detail individually.

5.2.1 *Load alleviation*

The issue at hand is the fact that even though one project is the main priority of the day other projects, customers or questions may come up during the day that needs be taken care of as soon as possible. As one consultant put it:

“... if I’m gone until lunch there will be 10 emails waiting...”

The problem caused by having email lying and waiting is the amount of stress it generates. Many of our interviewees are expressing anxiety over the fact that there may be email waiting, or the fact that they can not access them at this particular moment. As another consultant replied when asked if it is troubling to have a stack of email waiting:

“Yes it absolutely is. It is vastly stressing. To know that, these [emails] are waiting”

The smartphone remedies this issue to a great extent with its great mobility and possibility to access email from anywhere. One consultant solved the above-mentioned problem by sitting down at for example lunch to take care of the load that had accumulated during his absence. Because of this he can continue to focus on the matters at hand, and at the same time be relaxed knowing that the other customers are satisfied for the moment.

However the alleviation can also be done when there is less to do, such as a weekend in a relaxed environment. One of our consultants appreciated answering emails in his spare time to feel more at ease when going to work the next day:

“...if I get an email over the weekend, I can answer that in five minutes if I’m not doing anything else. I see no reason to wait until Monday. [...] It is some sort of self-preservation, that I rather answer when I’m in a calm and relaxed environment and can answer in serenity than in the chaos of Monday morning”

This consultants work alleviation is different than the first consultants because of their different work situations. The first consultant is at customer meetings and almost never at his desk and can therefore lessen his workload by answering emails while on different jobs.

The second consultant is more focused on getting other, more important work done at his primary work hours, and is consequently trying to lessen his workload by answering less important emails at his spare time. The purpose remains the same though, to remove the stress caused by work piling up when they are unable to attend to it at that particular moment. This might be perceived as stressful, but according to the consultants this is relieving the stress of the situation. When asked if the smartphone contributed to stress, one consultant answered like this:

“No, quite the opposite, it [the smartphone] helps me to keep these small contacts with the customers to keep them calm, so I can focus on what I should do at that particular moment”

This statement indicates that the consultants find that the smartphone aid them in lessening their workload and decreasing the possible stressors of work, making the load alleviation pattern an important part of the consultants changed work behaviours.

5.2.2 Multitasking

Another way to curb the possible stress reactions of the constant information flow is the behavioural pattern of multitasking. A few of the consultants we asked are regularly on customer meetings, workshops and out of office most of their time. In order to govern the constant income of information even when out of office they simply use their smartphone at any given time to check and reply to everything that needs immediate attention. When we asked one consultant what he thought was the advantage of being able to be physically unconstrained and at the same time remain in control of things he said:

“That is the biggest perk, that whether you are in Sweden or abroad, in the car or at work, you always have the opportunity to at least begin process something, send it on or delegate and so on”

Later on, we asked him if he thought the possibility to make small contributions at any time or anywhere made him more efficient or creative, or inhibiting it:

“No I’d say, that it makes me more efficient I think. [...] ...If you are at an airport somewhere then you’ll have to work around the problem and try to solve it, right there and then. So I’d say, it fosters creativity rather than impeding it I think”

The problem for these consultants is the fact that they are busy with their everyday tasks, for example the current project, while at the same time having past, upcoming or parallel projects calling for attention. One of our consultants states that he is working on four or five projects at the same time, causing these issues. Another example of multitasking came from another one of the consultants, who said the following when asked whether small efforts every now and then was efficient:

“...if you have a workshop for two or three days and is waiting for a mail or the like one can always check, of course you could do that with the computer as well, but that is usually plugged in to a projector and so on.”

The smartphone can in this context aid with the multitasking of upholding the daily contacts with other customers, while at the same time performing a workshop without disruptions. In summary the multitasking behaviours stem from the constant information flow that the consultants in general so much appreciate. The result of this flow of information is the possibility to take care of small tasks that before had to be done at the office or at a more stationary device, which is something the flexible consultants hold in high esteem.

5.2.3 Active exposure

The last pattern of behaviour is the fact that consultants, in order to avoid stressful situations, actively expose themselves to their smartphone as a measure against stress. This is expressed in the answers to the question what would happen if they forgot their smartphone at home when they left for work:

“... no, one day without the phone at my job would not work for me, in that case I’d be stressed, I would. That’s not an option.”

“I have thought many times about how far away from home I’d have to be and still turn around and get it. [...] I probably would have turned around from Helsingborg and drove back and got it, that is two hours by car”

“In that case I’d have to go home and get it, that wouldn’t work”

Not a single one of them could last one day at work without their smartphones, all of them saying they would go back to get it rather than be a whole day at work without their phone. As one consultant put it:

“... I don’t think the world would stop because I don’t have the phone one day, but it would feel like it”

Furthermore, the fact that not one of the six interviewees chooses to ever turn off their phone, not even when they are experiencing stress, is showing a very deliberate exposure to the smartphone functionalities. The active exposure can once again be derived from the need to have a constant control, as mentioned in 4.3. The consultants simply feel that if they turn the phone off, or leave it at home for a day, this will generate more stress than keeping it on their person at all times and that the active exposure eliminates that sort of stress. For example what this consultant is thinking about stress in the context of smartphones:

“In relation to the smartphone I’d say that I experience more stress when I can’t check my emails, than when I can actually receive them and see what is there. However I don’t experience that I feel stressed by seeing that there’s mail incoming, as long as I can see what they are about [...] I don’t find that stressful as long as I know what is there [in the mailbox]”

This statement once again shows how much control is important, which Glise also points out numerous times. A situation than can be controlled is not perceived as stressful³, and in the case of our study population the way to control the situation is to be in constant proximity to one's smartphone.

5.3 SUMMARISING ASPECTS

More in detail described above, we have conceptualised two major ways to prevent smartphone related stress – passive and active approaches. Active approaches, as the definition implies, are usage patterns that to a greater extent are individualised by a specific consultant – such as different ways of multitasking, actively expose oneself to information flows and alleviate workload with the aid of the smartphone. Passive approaches, on the other hand, are patterns that are more general and static for the whole study population. Passive approaches are, for example, about how to leverage availability and constant connectivity as a means to avoid stress, and the freedom of choice regarding connectivity as well.

In the following section we consider possible variations in outcomes of our result, with the above mentioned aspects as the base for our discussion. Hence, the next section will contain a short discussion, our conclusion in respect to our question at issue and a short reflection regarding possible improvements.



³ Kristina Glise, chief physician, interviewed 2012-04-05

6. DISCUSSION

Our work with this thesis has elapsed without any major incidents. One possible difficulty that we have been able to avoid is not getting in contact with the desired study population – all consultants have to our satisfaction gladly agreed to being interviewed on short notice. Furthermore, after the interviews were conducted the finding of patterns for our result went without difficulties, since we experienced that our analysis method was in good harmony with our theoretical foundation. Much of the nuances of the theories were central in the gathered material, of course due to our interview material being influenced by the theories, but also as we noticed the interviewees freely brought up theoretical aspects without being asked.

In terms of answering our question at issue we, with the just described working progress in mind, feel that we have succeeded. Succeeded in a sense that the result is underpinned with in our view reliable data, generated from our study population and influenced by a foundation of research from relevant fields. In our result we have discovered two global patterns, with a total number of six sub patterns, all answering the initial question. One of our most influencing theories is the one of Thomée (2012), who emphasises the stress generating aspects of ICT use. As a direct result of our question at issue, which looks at the matter from the opposite angle, we have come to insights both supporting and objecting the conclusions of Thomée. Supportive elements of our findings were primarily when consultants expressed that their usage of smartphones in certain situations generated stress, which conforms to Thomée's insights. Objective conclusions, on the other hand, especially had to do with the consultants adjusting and adapting their usage to actually prevent stress – a factor that does not conform to Thomée's conclusions. The obvious reason for these conflicting insights is that our question is focusing on another aspect of the context. Moreover, our study is focused on a specific group of people, somewhat neutrally positioned towards stress, but possibly above average used to intensive ICT use making them more inclined to actively use technical devices to their own advantage. That fact might have biased the results, but on the other hand our study required, in order to obtain data of interest, this choice.

6.1 CONCLUSION

We have, without implying that smartphone usage does not have the ability to generate stress, come to the conclusion that by adjusting one's usage patterns the same device can be the means to circumvent stress. We have conceptualised this conclusion as patterns. Two global patterns were identified separating *active* and *passive* stress avoiding approaches. These patterns are used in different ways, where the active approaches are in general more individually influenced (such as different types of multitasking) and the passive approaches are more static (such as leveraging information flows to one's advantage) and covers a wider spectrum of studied consultants. Our study concludes that the usage of these patterns is positively affecting the involved consultants in terms of stress prevention.

6.2 REFLECTION

Aspects that could have been improved, and thus contributed to a different and perhaps more solid result, are to begin with the number of interviewees. It is our belief that as a consequence of more interviews we could have received not only a wider information base, but also a more legitimate result in terms of patterns. Additionally, concerning the study population, we think that by including a wider spectrum of people (e.g. academics) instead of limiting our study to only IT consultants we could have come to more nuanced insights

applicable on a larger scale. Finally, a wider age span may have contributed to a different result due to different priorities in life, working life experiences and ambitions.

For future studies we would find it both relevant and interesting to investigate further the relation between stress generation and prevention caused by the same device. The result from a study of this form, covering above mentioned improvements, could potentially be useful for common people as well as employers – in particular since the smartphone usage is expected to grow and the device to get more intertwined with its context of use.



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8. APPENDIXES

8.1 INTERVIEW QUESTIONS

INTERVIEW QUESTION SHEET

SECTION 1: PRIVATE AND PROFESSIONAL USE

1. How much do you use your smartphone a day?
2. On what hours do you use your smartphone?
3. Do you have the same number in private as you have in your professional life?
→ If yes/no: Why?
4. What do you use your smartphone for, except calling and texting?
→ If non-exhausting answer: Can you specify further?
5. What specific smartphone functionality is most important for you at work and on leisure hours – and why?
6. How do you mostly communicate with colleagues, customers and friends?

SECTION 2: PROS AND CONS WITH SMARTPHONE USAGE

7. Does a smartphone give you greater possibility to individualise your work tasks?
→ If yes: How? If no: Why not?
8. a) Do you value physical freedom of movement in your work and private life?
b) If respondent values: What advantages do you see in this?
c) Do you perceive that the smartphone gives you greater freedom to move freely during working hours?
→ If non-exhausting answer: Why/Why not?
9. Does the smartphone techniques' possibility for minor point operations make you more creative/efficient or the opposite?
10. Imagine a scenario where you, instead of a smartphone, had access to an older mobile phone, that only allowed you to call and send text messages – how had that affected your work? What had you been missing?

SECTION 3: CONNECTIVITY AND STRESS

11. What is stress for you?
12. Do you experience that your work makes you stressed?
→ If yes: Why?
13. Do you perceive that your smartphone can make you stressed? In that case – when, where and how?
14. Do you feel that you get a pause from work, regardless if it is on a break or when you get home?
15. Do you use your smartphone for work related activities even when you would consider yourself “unscheduled”?
16. What do you feel if you happened to forget your phone at home when going to work?
17. What do you feel if you happened to forget your phone at work when going home?

SECTION 4: SUMMARISING YES/NO QUESTIONS

18. Do you turn your smartphone off when you want to relax?
19. Do you have your smartphone on round-the-clock?
20. Do you answer job related SMS/e-mails/calls on evenings?
21. Do you use your smartphone's alarm functionality in the mornings?
22. Do you feel pressure from friends, family and colleagues to always be reachable?
23. Are you rather constantly connected, than to check information that you have received from time to time?
24. Do you perceive a dependency towards your smartphone?